SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-40

Name: Lake Goldsmith **County**: Brookings
Legal Description: T110N- R51W-Sec 9, 16
Location from nearest town: 1 mile north, 1 mile west of Volga, SD

Dates of present survey: July 4-5, 2007
Dates of last survey: June 29-30, 2005

Primary Game Species	Other Species
Yellow Perch	Northern Pike
Walleye	White Crappie
	Bluegill
	Black Bullhead
	Hybrid Sunfish
	White Sucker
	Common Carp
	Bigmouth Buffalo
	Golden Shiner
	Green Sunfish

PHYSICAL DATA

Surface area: 288 acres **Watershed area:** Unknown acres
Maximum depth: 9 feet **Mean depth:** 6 feet
Volume: 1,826 acre feet **Shoreline length:** 2.3 miles
Contour map available: Yes **Date mapped:** 1970
Lake elevation observed during the survey: 1 ft. low
Beneficial use classifications: (6) Warmwater marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation, recreation, and stock watering

Introduction

Lake Goldsmith is a small natural lake located near the town of Volga in Brookings County. The watershed consists of mostly cropland, which drains to the inlet located in the northwest corner of the lake. The outlet located on the northeast corner, drains to the Big Sioux River. The lake is shallow and frequently winterkills which makes maintaining a fishery difficult.

Ownership of Lake and Adjacent Lakeshore Property

Lake Goldsmith is listed as a meandered lake in the State of South Dakota Listing of Meandered Lakes. The South Dakota Department of Game, Fish and Parks (GFP) manages the fishery but does not own any land surrounding the lake.

Fishing Access

A public road right-of-way runs along the south shoreline of the lake. There are several spots along this road accessible to shore anglers and small boats can be launched on a sandy beach near the west end.

Field Observations of Water Quality and Aquatic Vegetation

A dense blue-green algae bloom during the survey resulted in a Secchi measurement of only 30 cm (12 in). No aquatic macrophytes were observed.

BIOLOGICAL DATA

Methods:

Lake Goldsmith was sampled on July 4-5, 2007 with 3 overnight gill-net sets and 5 overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill-nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. Sampling locations are displayed in Figure 2.

Results and Discussion:

Gill Net Catch

Black bullhead (35.8%), walleye (33.6%), and white sucker (20.4%), were the most abundant species sampled in the gill-nets (Table 1). Other species sampled included common carp, yellow perch, bigmouth buffalo, northern pike, and white bass.

Table 1. Total catch from three overnight gill-net sets at Goldsmith Lake, Brookings County, July 4-5, 2007.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	49	35.8	16.3	±9.7	13.3	8	0	89
Walleye	46	33.6	15.3	±0.4	0.7	33	2	92
White Sucker	28	20.4	9.3	±1.1	1.9	82	18	92
Common Carp	4	2.9	1.3	±0.9	9.6	--	--	--
Yellow Perch	3	2.2	1.0	±0.7	10.7	--	--	--
Bigmouth Buffalo	3	2.2	1.0	±1.3	0.3	--	--	--
Northern Pike	3	2.2	1.0	±0.7	1.3	--	--	--
White Bass	1	0.7	0.3	±0.4	0.0	--	--	--

* 5 years (1997, 1999, 2001, 2003, 2005)

[1] See Appendix A for definitions of CPUE, PSD, and mean Wr.

Trap Net Catch

Black bullheads (92.1%) were the most abundant species sampled in the trap nets (Table 2). Other species sampled included bigmouth buffalo, walleye, white sucker, white crappie, northern pike, white bass, yellow perch, green sunfish, orange-spotted sunfish, and common carp.

Table 2. Total catch from five overnight trap net sets at Goldsmith Lake, Brookings County, July 4-5, 2007.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	1,135	92.1	227.0	±144.5	81.1	6	0	90
Bigmouth Buffalo	38	3.1	7.6	±2.5	2.1	53	0	95
Walleye	16	1.3	3.2	±1.6	0.8	6	0	96
White Sucker	13	1.1	2.6	±1.7	1.5	18	9	89
White Crappie	13	1.1	2.6	±3.0	0.9	100	100	97
Northern Pike	8	0.6	1.6	±0.7	0.9	--	--	--
White Bass	3	0.2	0.6	±0.3	0.2	--	--	--
Yellow Perch	3	0.2	0.6	±0.3	4.8	--	--	--
Green Sunfish	2	0.2	0.4	±0.5	0.1	--	--	--
O. S. Sunfish	1	0.1	0.2	±0.3	1.5	--	--	--
Common Carp	1	0.1	0.2	±0.3	8.2	--	--	--

* 5 years (1997, 1999, 2001, 2003, 2005)

Walleye

Management objective: Establish and maintain a walleye fishery following winterkills and whenever water levels are sufficient to sustain fish life for a reasonable length of time.

Walleye gill-net CPUE increased (Table 3) in 2007 due to fingerling stockings in 2004, 2005 and 2006 (Table 7). The fish sampled ranged in length from 245 mm (9.6 in) to 590 mm (23.2 in) with a mean length of 354 mm (13.9 in).

Table 3. Walleye/saugeye* gill-net CPUE, PSD, RSD-P, and mean Wr for Goldsmith Lake, Brookings County, 1998-2007.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CPUE		12.0		3.3		2.0		4.0		15.3
PSD		--		--		0		0		33
RSD-P		--		--		0		0		2
Mean Wr		--		--		97		90		92

* Saugeye management was discontinued in 2003

Yellow Perch

Management objective: Establish and maintain a yellow perch fishery following winterkills and whenever water levels are sufficient to sustain fish life for a reasonable length of time.

Yellow perch gill-net CPUE was very low this year (Table 4) due to several years of poor reproduction. The latest yellow perch stocking (14,136 juveniles) was made in 2002.

Table 4. Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for Goldsmith Lake, Brookings County, 1999-2007.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Mean*
CPUE		7.3		2.0		12.7		4.7		1.0	11.7
PSD		27		--		79		71		--	56
RSD-P		0		--		3		0		--	1
Mean Wr		93		--		102		103		--	100

*6 years (1995, 1997, 1999, 2001, 2003, 2005)

Black Bullhead

Management objective: Maintain a bullhead population with a trap-net CPUE of no more than 100.

Black bullhead trap-net CPUE has been increasing since 2003 (Table 5). The length-frequency histograms in Figure 1 illustrate a population comprised mostly of one strong year class containing fish with a mean length of only 188 mm (7.4 in).

Table 5. Black bullhead trap-net CPUE, PSD, RSD-P, and mean Wr for Goldsmith Lake, Brookings County, 1999-2007.

	1999	2000	2001	2002	2003	2004	2005	2006	2007
CPUE	62.0		28.8		26.4		108.7		227.0
PSD	40		2		1		2		6
RSD-P	1		0		0		0		0
Mean Wr	--		92		88		--		90

All Species

Goldsmith Lake contains a diverse fish community with fifteen species sampled over the last ten years (Table 6). All game fish CPUEs are below regional objectives. Rough fish CPUE is low at this time. Although they have not yet been sampled in our surveys, anglers reported catching numbers of small white bass in 2007. Adult white bass may have entered the lake from the Big Sioux River or by illegal stocking.

Table 6. Gill-net (GN) or trap-net (TN) CPUE for all fish species sampled in Goldsmith Lake, Brookings County, 1999-2007.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007
GOS (GN)	0.3		--		--		--		--
GOS (TN)	--		--		--		--		--
COC (GN)	7.7		2.3		1.0		--		1.3
COC (TN)	2.9		3.4		2.4		0.1		0.2
WHS (GN)	1.3		2.0		1.3		2.0		9.3
WHS (TN)	0.3		2.8		3.2		0.7		2.6
BIB (GN)	--		1.3		--		--		1.0
BIB (TN)	0.4		6.4		2.4		0.4		7.6
BLB (GN)	33.0		4.7		0.3		--		16.3
BLB (TN)	62.0		28.8		26.4		108.7		227.0
NOP (GN)	4.3		0.3		0.7		--		1.0
NOP (TN)	0.9		1.0		0.8		0.9		1.6
WHB (GN)	--		--		--		--		0.3
WHB (TN)	--		--		1.2		--		0.6
WHC (GN)	--		0.3		2.3		--		--
WHC (TN)	0.7		1.2		2.6		--		2.6
GSF (GN)	--		--		0.7		--		--
GSF (TN)	0.1		--		--		--		0.4
OSF (GN)	--		--		--		--		--
OSF (TN)	--		--		0.4		0.1		0.2
HYB (GN)	--		--		--		--		--
HYB (TN)	0.1		--		--		30.8		--
BLG (GN)	--		--		--		--		--
BLG (TN)	0.1		--		0.2		7.3		--
WHS (GN)	1.3		2.0		1.3		2.0		9.3
WHS (TN)	0.3		2.8		3.2		0.7		2.6
YEP (GN)	2.0		12.7		4.7		27.0		1.0
YEP (TN)	7.4		0.8		0.8		13.9		0.6
SXW (GN)	3.3		2.0		2.0		--		--
SXW (TN)	0.9		0.4		0.2		--		--
WAE (GN)	--		--		3.7		--		15.3
WAE (TN)	--		--		4.0		--		3.2

GOS (Golden Shiner), COC (Common Carp), WHS (White Sucker), BIB (Bigmouth Buffalo), BLB (Black Bullhead), NOP (Northern Pike), WHB (White Bass), GSF (Green Sunfish), OSF (Orange-spotted Sunfish), HYB (Hybrid Sunfish), BLG (Bluegill), WHC (White Crappie),YEP (Yellow Perch), SXW (Saugeye), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. Continue to conduct lake surveys every other year to evaluate management efforts. The next survey will be in 2009.

2. Encourage commercial fishing for rough fish and black bullheads whenever the populations are marketable.

3. Investigate the possibility of establishing a lake access area with a boat ramp.

Table 7. Stocking record for Goldsmith Lake, Brookings County, 1991-2007.

Year	Number	Species	Size
1992	60,000	Saugeye	Fingerling
	7,419	Yellow Perch	Fingerling
1993	30,000	Saugeye	Fingerling
	300	White Crappie	Adult
1994	200,000	Saugeye	Fry
1995	30,000	Saugeye	Fingerling
	617	Saugeye	Adult
1996	20,466	Yellow Perch	Fingerling
1997	28,800	Saugeye	Fingerling
	6,552	Yellow Perch	Fingerling
	2,713	Yellow Perch	Adult
	6,465	Bluegill	Adult
	6,087	Hybrid Sunfish	Adult
1998	6,759	Bluegill	Adult
	15,926	Hybrid Sunfish	Adult
1999	1,385	Bluegill	Adult
	2,319	Green Sunfish	Adult
	1,065	Yellow Perch	Adult
2000	600,000	Saugeye	Fry
	2,301	White Crappie	Adult
	3,000	Yellow Perch	Adult
2001	500,000	Saugeye	Fry
	31,350	Saugeye	Fingerling
2002	14,136	Yellow Perch	Juvenile
2004	41,600	Walleye	Fingerling
2005	29,200	Walleye	Fingerling
2006	31,200	Walleye	Fingerling

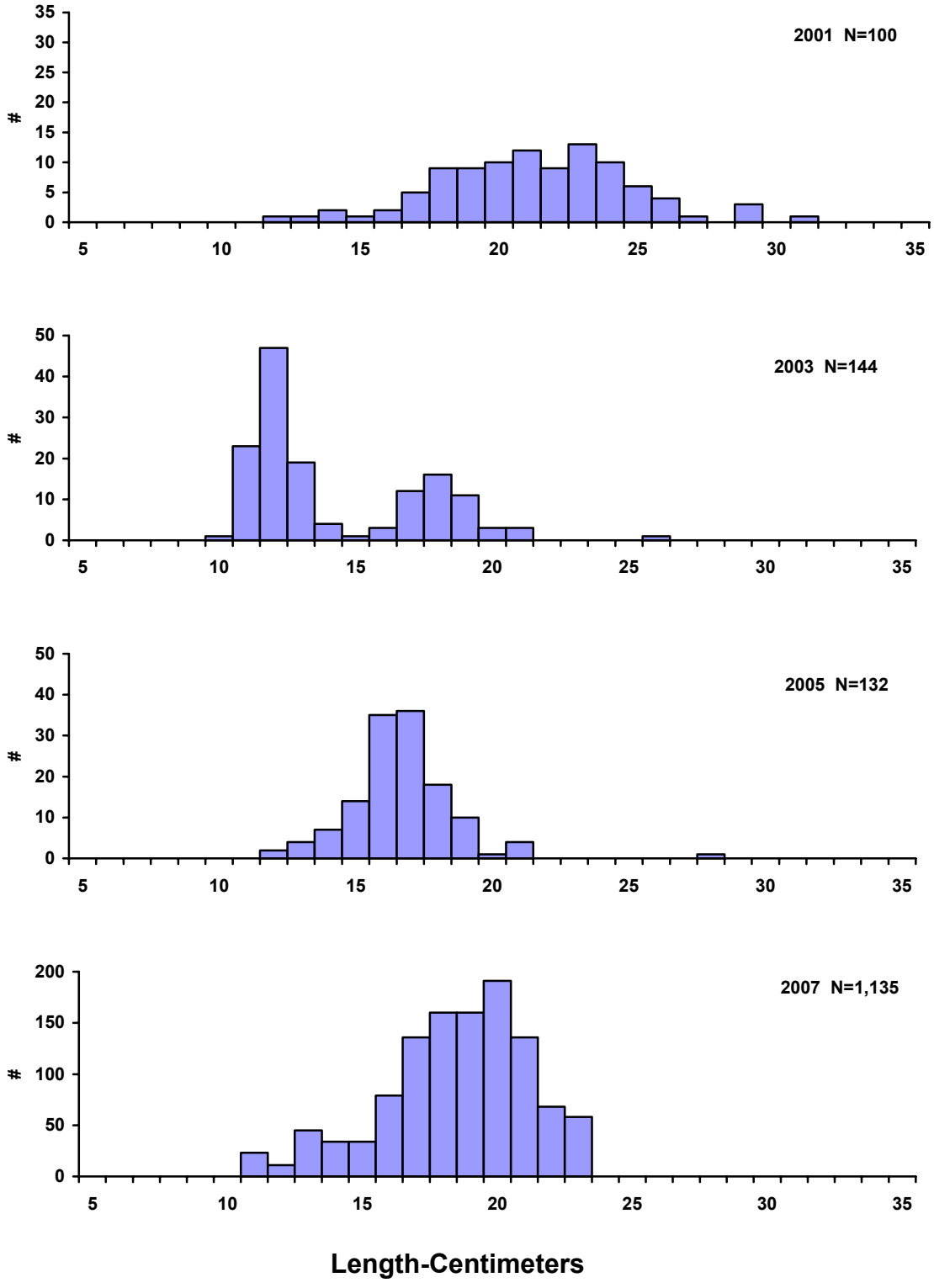

Figure 1. Length frequency histograms for black bullheads sampled with trap nets in Lake Goldsmith, Brookings County, 2001, 2003, 2005, and 2007.

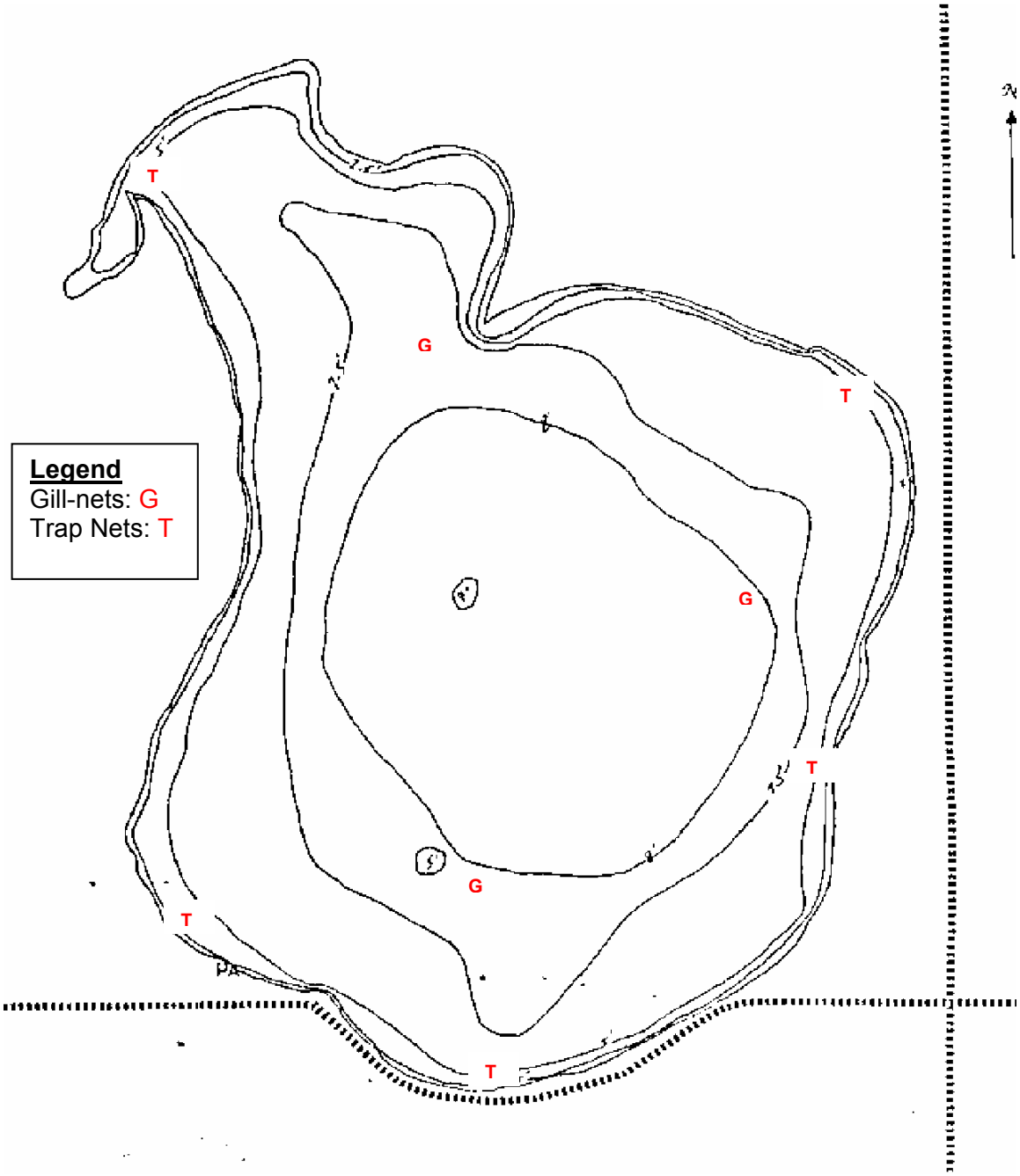

Figure 2. Sampling locations on Lake Goldsmith, Brookings County, 2007.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.